KIT, DETERGENT COMPOSITION, AND METHOD FOR MANUFACTURING SEMICONDUCTOR ELEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to kit with a temporary bonding material including a silicone compound and a detergent composition for removing the temporary bonding material; a detergent composition; and a method for manufacturing a semiconductor element.

2. Description of the Related Art

[0002] A detergent composition for removing a temporary bonding material has hitherto been studied. For example, in JP2016-011361A, a peeling composition for removing a bonding material including a styrene-based hydrogenated elastomer, which includes at least one of a cyclic terpene-based solvent, a nonionic surfactant, or a silicon-based surfactant is disclosed.

SUMMARY

[0004] As a result of the studies on the peeling composition described in JP2016-011361A, it was found that the peeling composition has an effect on the peeling of a bonding material including a styrene-based hydrogenated elastomer, but cannot remove a residue derived from a release agent sufficiently. Further, the present inventors have studied thereon, and thus, it was found that a residue derived from a silicone compound particularly easily remains.

The present invention is made to solve such problems, and thus, has an object to provide a kit including a temporary bonding material and a detergent composition, the kit being capable of suitably removing a residue derived from the temporary bonding material including a silicone compound; a detergent composition; and a method for manufacturing a semiconductor element.

[0004a] In one aspect of the present disclosure, there is provided a kit comprising:

a detergent composition including an acid or base and an organic solvent; and

a temporary bonding material including a silicone compound,

wherein a value represented by Formula (a) of the acid is 0 to 10 and a value represented by Formula (b) of the base is -5 to 0;

Formula (a) ClogP-pKa

Formula (b) ClogP-pKb

in Formulae (a) and (b), ClogP represents a value represented by a base-10 logarithm logP of P which is a 1-octanol/water partition coefficient representing a ratio of an equilibrium concentration in 1-octanol and water, pKa represents an acid dissociation constant, and pKb represents a base dissociation constant.

[0004b] In another aspect of the present disclosure, there is provided a detergent composition for a temporary bonding material including a silicone compound, comprising:

an acid or base; and

an organic solvent,

wherein a value represented by Formula (a) of the acid is 0 to 10 and a value represented by Formula (b) of the base is -5 to 0;

Formula (a) ClogP-pKa

Formula (b) ClogP-pKb

in Formulae (a) and (b), ClogP represents a value represented by a base-10 logarithm logP of P which is a 1-octanol/water partition coefficient representing a ratio of an equilibrium concentration in 1-octanol and water, pKa represents an acid dissociation constant, and pKb represents a base dissociation constant.

[0004c] In a further aspect of the present disclosure, there is provided a method for manufacturing a semiconductor element, comprising removing a temporary bonding material including a silicone compound using a detergent composition including an acid or base and an organic solvent,

wherein a value represented by Formula (a) of the acid is 0 to 10 and a value represented by Formula (b) of the base is -5 to 0;

Formula (a) ClogP-pKa

Formula (b) ClogP-pKb

in Formulae (a) and (b), ClogP represents a value represented by a base-10 logarithm logP of P which is a 1-octanol/water partition coefficient representing a ratio of an equilibrium concentration in 1-octanol and water, pKa represents an acid dissociation constant, and pKb represents a base dissociation constant.

[0005] With regard to the object, the present inventors have conducted extensive studies, and as a result, they have found that the object can be accomplished by removing a temporary bonding material including a silicone compound with a detergent composition including an acid or base and an organic solvent. Specifically, according to <1>, and preferably according to <2> to <30>, the object was accomplished.

<1> A kit comprising:

a detergent composition including an acid or base and an organic solvent; and

a temporary bonding material including a silicone compound,

in which a value represented by Formula (a) of the acid is 0 to 10 and a value

substrate to be processed after peeling off the carrier substrate, and the temporary bonding material remaining on the substrate to be processed after peeling off the carrier substrate and further peeling off the temporary bonding material.

[0006] According to the present disclosure, it is possible to provide a kit including a temporary bonding material and a detergent composition, the kit being capable of suitably removing a residue derived from the temporary bonding material including a silicone compound; a detergent composition; and a method for manufacturing a semiconductor element.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Fig. 1 is a schematic view of a first embodiment illustrating a method for manufacturing a semiconductor element.

Fig. 2 is a schematic view of a second embodiment illustrating a method for manufacturing a semiconductor element.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] Hereinafter, the contents of the present invention will be described in detail. Further, in the present specification, “(a value) to (a value)” is used to mean a range including the numerical values described before and after “to” as a lower limit value and an upper limit value, respectively.

In citations for a group (atomic group) in the present specification, in a case where the group (atomic group) is denoted without specifying whether it is substituted or unsubstituted, the group (atomic group) includes both a group (atomic group) not having a substituent and a group (atomic group) having a substituent. For example, an “alkyl group” includes not only an alkyl group not having a substituent (unsubstituted alkyl group) but also an alkyl group having a substituent (substituted alkyl group).

“Actinic rays” or “radiation” in the present specification means, for example, visible light, ultraviolet rays, far ultraviolet rays, electron beams, and X-rays.

“Exposure” in the present specification includes, unless otherwise specified, not only exposure using light but also writing using particle rays such as electron beams and ion beams. Further, examples of light used for exposure generally include actinic rays or radiation such as a bright line spectrum of a mercury lamp, far ultraviolet rays typified by an excimer laser, extreme ultraviolet rays (EUV light), X-rays, and electron beams.

In the present specification, the total solid content refers to a total mass of components excluding a solvent from a composition.

In the present specification, “(meth)acrylate” represents acrylate and methacrylate,